Name:

at1124exam: Radicals and Squares (v913)

Question 1

Simplify the radical expressions.

$\sqrt{28}$	$\sqrt{12}$	$\sqrt{98}$
$\sqrt{2 \cdot 2 \cdot 7}$	$\sqrt{2 \cdot 2 \cdot 3}$	$\sqrt{7 \cdot 7 \cdot 2}$
$2\sqrt{7}$	$2\sqrt{3}$	$7\sqrt{2}$

Question 2

Find all solutions to the equation below:

$$\frac{(x+9)^2+5}{9} = 6$$

First, multiply both sides by 9.

$$(x+9)^2+5 = 54$$

Then, subtract 5 from both sides.

$$(x+9)^2 = 49$$

Undo the squaring. Remember the plus-minus symbol.

$$x+9 = \pm 7$$

Subtract 9 from both sides.

$$x = -9 \pm 7$$

So the two solutions are $x = -2$ and $x = -16$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 14x = -33$$

$$x^2 - 14x + 49 = -33 + 49$$
$$x^2 - 14x + 49 = 16$$
$$(x-7)^2 = 16$$
$$x - 7 = \pm 4$$
$$x = 7 \pm 4$$
$$x = 11 \quad \text{or} \quad x = 3$$

Question 4

Any quadratic function, with vertex at (h, k), can be expressed in vertex form:

$$y = a(x-h)^2 + k$$

A quadratic function is shown below in standard form.

$$y = 4x^2 + 40x + 93$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 4 .

$$y = 4(x^2 + 10x) + 93$$

We want a perfect square. Halve 10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 4(x^2 + 10x + 25 - 25) + 93$$

Factor the perfect-square trinomial.

$$y = 4((x+5)^2 - 25) + 93$$

Distribute the 4.

$$y = 4(x+5)^2 - 100 + 93$$

Combine the constants to get **vertex form**:

$$y = 4(x+5)^2 - 7$$

The vertex is at point $(-5, -7)$.